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# INDUSTRIAL EDUCATION <sup>1</sup>

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I speak on "Industrial Education" with much diffidence, as I have never given the subject any systematic study, and what I have to say today is based mainly on observations of factory life in one village with which I have been intimately associated for thirty years. But I think I may fairly assume that the conditions are substantially the same as those existing in other manufacturing towns.

I have felt the need of industrial education myself, and I have seen the need of it in others. As a boy I had my own carpenter shop, including a cheap foot-lathe to which I added all the attachments I could invent. When this did not satisfy me, I used to walk two miles out to Roxbury to work in the repair-shops of the cordage-works. These shops were in a dark, damp basement with a dirt floor, and were supplied with prehistoric tools. At that time I think my idea of heaven would have been such a shop as now exists in all scientific and technical schools. But as that heaven did not then exist, I accepted the academic course and became a poor classical scholar, when I might have made a good mechanic. It was just at that time that original experimental work was being introduced, and Professor Trowbridge set me to make some experiments in magnetism for which I was to make my own apparatus. The Lawrence Scientific School then boasted an old foot-power engine lathe, one chuck, and a few dull tools, but no grindstone. This represented the industrial education offered to a Harvard student thirty years ago.

What were the educational facilities in the factories at this time? My associations have been mainly with Scotch-trained overseers, and our general superintendent tells me that, when he

<sup>1</sup> Address read before a meeting of the Harvard Teachers' Association, March 2, 1907.

was young, a boy's only chance was to pick up what knowledge he could in his routine work, and that this was made even more difficult as the overseers, having worked hard for their own knowledge, guarded it jealously. When I was working in the mills, I remember how amused I was when an old English overseer, as a great favor, showed me how to figure drafts by simple proportion.

In all discussions of industrial training I have heard very little said about its application to boys or girls in our textile mills. And yet, in order to take in all industries, it must include the factory operative, the unskilled as well as the skilled; and it is on industrial training in connection with the factory system that I wish to speak.

In the factory system we have a small number of more or less skilled workers, and a large number of unskilled; and we must have them, or the industry will cease to exist. A single community may be made up of highly skilled and highly paid workers, but the country as a whole has a large proportion of unskilled work which must be done, and which should be done by the least intelligent. It is therefore not a question of converting all workers into skilled workers, but of selecting those who have the greatest natural ability; to educate these properly to fill the places to which they have the ability to rise; and to give to the rest such education as will fit them to fulfil such civic and family duties as may fall to their lot. Moreover, I claim that these latter should be taught how to find enjoyment in life, without recourse to those forms of pleasure which degrade. No civic life can be healthy where the people cannot secure a reasonable amount of rational and innocent enjoyment; for, if they do not get it in its innocent forms, they will get it in others, to their own injury and with cost to the community.

Closely associated with the question of industrial education is the question of the proper age at which children may be put to work. We recall with horror the time when children of nine or ten were worked twelve hours a day. It is not many years since Massachusetts worked children of twelve eleven hours a day, and it is still done in the South. Massachusetts now allows

children of fourteen to be worked fifty-eight hours a week; but at our own works we have cut this down to fifty-five, as we believe these hours long enough for a mill employing women and children. I do not claim that fifty-five hours a week is the limit at which legislation should stop; but I do feel that some of us in Massachusetts are a little hysterical on this subject, and that we cannot go too far in advance of legislation in other states. The factory operative all over the country is being recruited from the freshly arrived immigrants; and experience shows that immigrant families will go to those states which permit the largest number of the family to work. This tendency of parents to work their children to the last limit of the law is illustrated by the statement of a southern manufacturer, who told me of a small girl whom he had not the heart to work, but kept on his pay-roll, as otherwise the father would have taken the whole family to another mill.

Nevertheless, I believe that one of the most important lessons to learn is to do early in life that which we have to do throughout life. The professional man, the teacher, the scientist, the man who works with his brain, must learn as a child to apply his mind. Likewise, a boy or girl who is to be a manual worker should early learn the habit of work.

As far as I know, there has never been any scientific attempt to determine the age at which children can work without injury to their future health and development. Philanthropists and the intelligent workmen, on the one hand, have been for raising the school age; manufacturers, on the other, as a rule have opposed it. I should like to see the United States Children's Bureau appoint the strongest commission that could be named; have this commission make an exhaustive investigation and study of this subject; and then have the friends of the children use this report as a basis for their work in the various state legislatures, or possibly have its findings incorporated into the proposed federal corporation law, so that all corporations wishing to do an interstate business, in any specified industry, would have to conform to one rule as regards child labor—a rule based on a scientific investigation.

There are certain industrial operations which a child can learn better than a grown person; for example, spinning, in which children of fourteen or fifteen can acquire the manual dexterity more easily than those of a more advanced age; and, having acquired this dexterity, they command higher wages than those who can do only unskilled work. On the other hand, there are certain important subjects of education—cooking, household economics, the care of children and of the sick—which can best be taught at an age later than that at which children can properly be put to work. It therefore follows that there is a time when work and schooling should be combined.

As it is at present, almost all our factory children enter the mills at fourteen, with the most meager education. The child receives no further education of any kind; nor has he reached the age when he can continue his education without outside help. And yet he is just at the age when character and habits are becoming settled. As a result of this complete cessation of education, combined with the deadening effects of monotonous work, the majority of these boys and girls have their lives stunted, and many with natural ability have their whole lives ruined at this period. Nor is this all. We see the evil effects also in the next generation, in ill-fed and ill-cared-for children. I think our system of education is at fault in this, that we pay too much attention to the advanced education of a few children simply because their parents can afford to keep them at school, and too little to the education of the large majority who are in sore need of it, both for their own good and for that of the community. It is not right that all schooling should be denied children, simply because they have been forced to become bread-winners; and I believe these children would benefit more by half-time schooling between fourteen and sixteen than by having the school age raised to fifteen years.

In planning for any advance in our social or industrial conditions—and in the broader sense the former include the latter—I hold that it is most important that we have in mind an ideal, a final goal for which we are striving. We may not see it clearly; we may not know how far off it is, or how many obsta-

cles are to be overcome; we may realize that, as with certain mathematical points, we may be always approaching, but can never reach it. Moreover, if our advance is to be successful and lasting, we must have it conform, not only to the spirit of the age in which we live, but also to the spirit of the ages. The spirit of our age is that of industrial progress and efficiency. By the spirit of the ages I mean the spirit of truth, justice, honesty, generosity, and self-denial; the spirit which in all time has actuated and maintained the world's progress toward civilization and righteousness.

I may seem to be wandering from the topic under consideration; but industrial education has so intensely practical a side that I fear we may forget the ideal and ethical when we discuss it, and the lessons of history tell us only too plainly that our failure to reach our goal will be due, not to industrial inefficiency, but to the want of those fundamental virtues which we all profess to have, but which we fail to practice.

When Professor Hanus asked me to speak at this dinner, I tried to project my ideas into the future; I tried to conceive an ideal, a goal, toward which our industrial education of factory children should lead. I had before me a large manufacturing village: all the people at work in one large industry; a perfect example of the product of the present industrial age—the large corporation, the managing heads, the department heads, the room foremen, and the wage-earners. I asked myself how many of those men and women, even the men in charge of whole rooms of machinery, had any idea of the historical development of the industry. How many knew anything about the various factors, unseen by them, which enter into the total of the great industry of which they are a part? What did they know? Practically nothing! And then, bearing in mind the fault found with the present industrial system, I asked: How is the system to be changed so long as this state of things last? What is the ideal system, and what steps must be taken to develop it? If the present so-called factory system is wrong, having grown up as the result of abnormally rapid and revolutionary changes in the world's industrial development, what ideal system must we set up as the goal for which we are to strive?

The ideal, as I conceive it, is an industrial community where one or more industries shall be owned and carried on by the people of the community themselves; where the industries shall be a part of the community life. The individual shall not only feel himself part of the industrial life, but shall feel that any position in the industry is open to him, provided he can prove his ability to fill it. This feeling existed in the armies of the first Napoleon and in part accounts for his success.

The school should give instruction in all branches of knowledge needed to carry on the business, or should arrange that the higher, specialized branches should be taught in special schools elsewhere. But the scholars should be carried only as far as they are able properly to apply the instruction given; and even after reaching this point selection should be made of those most capable. There should be no waste of educational advantages. It should be a survival of the fittest, where all have an equal chance; and the spirit of justice should be so fully developed that those who are left behind should feel that it was on account of their want of character or ability, and that their failure was not due to favoritism shown to others. So much for the dim future; now let me outline the plans for an industrial school which we have decided to start at our own works, and let us see how it fits in with this ideal.

First, in explanation, let me say that our industry is the carding and spinning of hemp and jute—an industry not common in this country, and less attractive than work in cotton and wool. There are no textile schools in America that give instruction in this industry, and most of the superintendents and overseers come from Scottish mills. Of our fifty-four overseers and second-hands, not one was educated in our village schools, although the industry has been established in the town for thirty-nine years and is the only manufacturing industry there. During the last twenty years the taxed valuation of the town has grown from \$808,000 to \$3,027,000. The schools have grown from a one-room ungraded school to three schoolhouses with seating capacity for 890 children. And yet at the present time no boy who received his education in these schools holds any position of responsibility in the textile departments; not one boy

in twenty graduates from the high school, and the boy who does is educated away from the mill. The boy who enters the mill at fourteen has his development arrested by continuous work; and even if he had the energy and ambition to continue his studies, the town has never provided a night school. As for the girls, three-fourths of them enter the mill at fourteen and stay there until they marry. They have no education in cooking, sewing, or any of the domestic duties which they will have to assume later.

I do not say this in any disrespect to the village schools. They are, I take it, a fair example of our New England factory-town schools, and I believe above the average. But this want of correlation between the schools and the needs of the industrial and social conditions of the town set me thinking. I asked myself: Are we always to be dependent upon foreigners for our managing men? Why is it that no boy, educated in the village school, has ever risen in the mill? The answer seemed to me to be that the position of an overseer in a jute- and hemp-mill did not appear as attractive as the many openings in the mechanical trades, and the way of arriving at it through the drudgery of the mill less so. As I have already said, the boys who have gone through the high school never enter the mill, and the boys who enter the mill at fourteen have their development arrested.

Our idea of an industrial school, to meet these conditions, is to select the brightest boys of fourteen as they leave the school. Through half a day's work in the mill we propose to develop in them habits of industry, and a recognition of the dignity of every form of useful labor, no matter how unattractive its conditions may be; the other half of the day we plan to instruct them in those studies which will aid them in their mill-work, will broaden their ideas of life, and will fit them to be leaders in the social and educational life of the village. At first their work in the mill will be simply as machine-tenders. But they will be moved from machine to machine in order to give them as much variety as possible. Later they will study the mechanism of the machinery, work in the repair-shops, learn to grade and handle fiber, make experimental tests in the running of machinery, and



receive instructions in the various details of mill management. They will have systematic gymnastic training, will be taught swimming and dancing, and will be encouraged to take a leading part in the athletic interests of the town. We want them to be of value, not only to the mill, but also to the community. What the results of this proposed school will be remains to be seen.

About a year ago we needed two superintendents. We should have much preferred to have advanced two of our overseers, but none of them seemed to have all the necessary qualifications, so we went abroad for our men. I asked our general superintendent this question: "Had our overseers, as boys, had the education our school proposes to give, how many of them could have been advanced to superintendents?" He replied that he thought a third. I think our proposed school will appeal to you all as a practical question of education; and it also seems to me to be a step toward the ideal industrial community which I have outlined.

Assume that the school is a success, and that every bright boy with abilities and character has a chance to develop himself; that many of these boys become second-hands, overseers, and superintendents, or fill other responsible positions. Suppose these men are encouraged to invest their savings in the industry, instead of in the savings bank. Suppose the town had the legal right to, and did, invest in this its great industry; that its schools adjusted their earlier studies to prepare for the industrial school, which later becomes a part of the village system. How far are we from the ideal industrial community which, by public or private ownership, owns its own industries and educates its citizens properly to conduct them? On the other hand, when we consider that our whole industrial system, as regards machinery, methods, and mill hands, is in a condition of flux and change, we are forced to the conclusion that our industrial undertakings have not reached that stability which would warrant a community interest such as I have suggested. But I look for the time when the chances for starting inventions or revolutionary methods will have passed, and when success will depend mainly on a

thorough knowledge of the industry as then practiced, combined with the intelligent and conscientious work of all employed. By that time, instead of having to receive and assimilate thousands of foreigners of different nationalities and strangers to our country and institutions, we shall have a homogeneous population, which our industrial schools should for generations have trained to be effective workers, not only in the mills, but in their homes.

Now, allow some generations of thrifty workers little by little to invest in an industry in which they and their fathers have worked—an industry the general outline of which they have been taught to understand, and in which they have confidence. Is it not possible to conceive that under favorable circumstances such an imaginary community might in time become a reality?